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THE IMPACTS OF AN EXPERIENTIAL-BASED LEARNING OPPORTUNITY

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by

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To the students of the 2016 Summer Field Based Science course who participated in my surveys—thank you! Without your willingness to participate and share your opinions, this research study would not have been possible.

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CHAPTER ONE

Introduction

Overview

This paper will address the question "What are the impacts of an experiential-based learning opportunity?" This question is significant to me because I felt inspired after participating in various field-based science classes throughout my life and I have become more confident in myself and more interested in the environment after each opportunity. Throughout these experiences, I not only built lasting friendships, but I also learned about myself and the environment in a fun and meaningful way. I feel that all young people should be given a chance to experience nature in this way. Through my research, I will seek to find out if the students who participated in the 2016 Summer Field Based Science course were impacted in a way that encouraged them to pursue more science related opportunities, reflect on their personal values as well as their footprint on the environment, and develop lifelong communication skills. I will do this by comparing their responses to a survey taken prior to the field course with the survey taken approximately two months after their experience.

Personal Experiences

As a child, my family would travel to Kimble Lake in Ideal, Minnesota to camp on land owned by my grandparents. Each summer we would spend several weekends

camping, fishing from the dock, and tubing on the lake. I thoroughly enjoyed "roughing-it" and learning from my grandfather about the animals in the woods nearby, the fish that we would catch, and anything else he would teach us about. As I got older, my siblings and I got busy with other activities and our careers so we did not have as many opportunities to vacation at "the lake." There was about a ten-year span between my middle school experience and college where I had little to no camping or environmental activity exposure. Though I loved camping as a child, I seemed to have lost interest as I grew older and I lost touch with the environment.

During my undergraduate work at the University of Wisconsin-Eau Claire, I was not particularly thrilled when I registered for Invertebrate Zoology, a field experience course. I lacked any special interest in animals and was actually afraid of insects at the time. I did not expect to enjoy the course in any way, but it was a requirement for my major, Biology Education. Throughout the semester, which included weekly fieldtrips to local creeks where we collected aquatic invertebrates for our final project, I began to enjoy learning about the insects and aquatic invertebrates that I caught. With each passing week, I found the field trips to be more enjoyable and worthwhile. My professor's passion for invertebrates and his expertise on these organisms was inspiring and engaging. By the end of the course I was no longer afraid of insects. Rather, I was excited to find bugs of all kinds on walks with my friends and in the lakes nearby. I would examine the critters and try to identify them using what I learned in the class. Additionally, this course encouraged me to continue learning more about invertebrates. It also allowed me to feel a deeper appreciation for the environment and I walked away

with a handful of new and like-minded friends. This course turned out to be one of the turning points that led to my interest in environmental studies.

Another turning point in my undergraduate career came the following semester. I was still feeling inspired by the Invertebrate Zoology course and I wanted to learn more, experience more, and continue to explore the environment with my new friends. In a meeting with my academic advisor, I learned of a course that was being offered during the 2008 winter term called Studies in Tropical Environments. This was a two-week long, field-based course that took place in San Salvador, Bahamas at the Gerace Research Center. One of the professors of the tropical studies course was Todd Wellnitz, the same instructor of the Invertebrate Zoology course that I had taken the previous year. It was he who helped rekindle my interest in the environment, so enrolling in the tropical studies course was an easy choice that I could not pass on. Each day that we were in the Bahamas, we snorkeled and observed the various corals, sponges, algae, and fish around the local reefs while carrying out our small group investigations. One afternoon, we cleaned up a beach and found an enormous amount of trash washed up on the shore that included computer monitors, plastic bags, random pieces of garbage, glass bottles, etc. We discussed the impact that all of this trash had on the marine life and the people who used that ecosystem to gather resources for their communities.

Another day, while snorkeling, we identified and learned about Lionfish, which are considered invasive species to that particular area. We had a great discussion about the impacts of non-native species in ecosystems that had been rich in biodiversity prior to the arrival of the invasive species. The Studies in Tropical Environments field course was eye-opening to me in that I was able to able to start making more meaningful

connections between human activities and the impact they have on our Earth's natural ecosystems.

A requirement in obtaining my Bachelor of Science degree was to complete a capstone project prior to graduation. During the 2008 spring semester, I chose to serve as a Student Assistant to Professor Wellnitz on a field trip to Pigeon Lake, Wisconsin for his entry-level Biology course. Part of my project was to teach short lessons to the students in the course. My role during the field trip was to lead the rotation blocks by bringing a small groups of students down to a creek that flows into Pigeon Lake to perform macroinvertebrate sampling. I showed the students how to use the different types of nets in the creek and then how to search the sediment for macroinvertebrates and fish. Although some of the students were afraid to touch the insects, they were interested in observing and learning about them. I convinced a few of the more skittish students to hold insects, like the caddisfly, and to take a closer look.

After collecting a variety of invertebrates down at the creek, we took some of them back to the classroom lab where the lesson continued. There, I taught the students how to identify the insects using a dichotomous key and I pointed out some of the unique characteristics of each organism that we brought back. This field trip was a fun opportunity for me to engage with others who were not necessarily interested in the environment and natural systems. I hoped that I was able to spark a bit of curiosity for that group of students so that they might look back on that experience and share it with their friends and family. For the students who already had an interest in the environment, or for those interested in pursuing a science degree, I hoped that I was able to add fuel to

their pre-existing passion and that the field-experience was a turning point in their lives just as it had been in mine a few semesters prior.

In the fall semester of 2008, I completed my student teaching internship in Altoona, Wisconsin, a small town just outside of Eau Claire. That same year, I graduated from UW-Eau Claire and was hired as a long-term substitute teacher at Memorial High School in Eau Claire beginning January 2009. I was a long-term substitute at Memorial High School until March 2009 and then held a similar position at Mondovi High School during May 2009. None of these teaching positions provided me with much of an opportunity to bring students outside and teach about ecology and the environment. The classroom teachers for whom I was substituting had pre-written lessons that were to be followed. I then moved back to my hometown, Excelsior, Minnesota, where I began to search for teaching jobs in the Twin Cities metro area. Eventually, I was hired to teach Biology at the high school of a highly regarded district located in a Western suburb of Minneapolis, Minnesota. I began my teaching career in September 2009. After working in the district for two years, I was invited to be a co-teacher of the summer Field Based Science (FBS) course offered by the high school.

The FBS course was designed by Eric Burfeind, a colleague of mine at the high school. This summer course, which is still running at the time of this research study, is comprised of a nine day canoe and camping trip for high school students. Burfeind formed a partnership with Laketrails Base Camp located on Oak Island in Lake of the Woods, Minnesota, which outfits all of the necessary gear and equipment for the FBS course. Prior to the trip, students must participate in classroom sessions where they learn how to identify various plants and animals, predict the weather based on cloud coverage

and pressure systems, and identify constellations in the night sky. During these classroom sessions they are divided into small groups that they will work with throughout the entirety of the course. In the classroom sessions, they begin designing a scientific experiment or a study that will be carried out on their camping adventure. In July, the nine-day excursion begins with students and staff lodging at the Laketrails Camp on Oak Island. This is where students learn how to set up their tents and portage a canoe. During this stay, they also finish planning their field study and canoe routes. The "on trail" portion of the trip is six day-five night canoe and camping adventure. This is a true experiential-based learning opportunity. While "on trail" the students do not have access to their mobile devices, television, or any other comforts of home. They must rely on their group members for support, learning, entertainment, and – to some extent –their survival instincts. The students learn first-hand how to conduct a field-study on the impacts of human activity on the natural landscapes, how to communicate with each other without distractions, and how to appreciate Mother Nature for all she has to offer. I have co-taught this course three times, and have observed students form meaningful relationships with their peers and these students return home feeling empowered, inspired, and thirsty for more adventure.

The field-experiences during my undergraduate courses at UW-Eau Claire inspired me to truly enjoy outdoor adventure, work to protect the natural systems, and encourage others feel and do the same. Co-teaching the summer FBS course has provided me an opportunity to work closely with our youth and to connect them with nature. It is my hope that some of my students will continue to learn and engage with the environment in their futures. For my capstone study, I surveyed the students of the 2016

summer FBS course prior to their field experience. That survey provided background information on the students' level of interest in science studies and their level of interest in the environment, as well as their opinions on their ability to communicate effectively, leadership skills, and future plans. Two months after their field-experience course, I surveyed the students again to see if their experience influenced their opinions regarding their level of interest in science, communication skills, and future plans.

Conclusion

My research question, "What are the impacts of an experiential-based learning opportunity?" is driven by the evolution of my own personal interest with nature through various courses, experiences, and relationships. Environmental studies is an important topic to me. I hope that more students will have the opportunity to have a first-hand learning experience with nature in the future so that they, too, may be inspired to learn about and engage with the environment, while having fun in the process. In the next chapter, I will examine the history and current status of environmental education, the history of the FBS course, benefits of experiential-based learning, and hindrances to environmental education.

CHAPTER TWO

Review of the Literature

Overview

The following literature review is supportive of my investigation that will look at the question: "What are the impacts of an experiential-based learning opportunity?" I will first examine the history of environmental education to identify themes and the significance of environmental education to the world around us. Next, I will introduce the current environmental education academic standards. Then, I will discuss the history of the summer Field Based Science course. I will also examine the benefits of experiential learning opportunities. Finally, I will discuss what hindrances exist that prevent young people from exposure to hands-on environmental education.

History of Environmental Education

Though it is nearly impossible to narrow down the true beginning of environmental education, there are several individuals, dating back to the 1700's, who emphasized the importance of the environment and how we can learn from it. Jean-Jacques Rousseau wrote a novel, *Emile,* which explained his educational philosophy (McCrea, 2006). He believed that young children should interact more with the world around them and less with books. Interacting with nature would help emphasize the development of their senses and their ability to draw inferences from them (Gianoutsos,

2006). Additionally, Louis Agassiz is a well-known scientist whose work dates back to the early 1800's (McCrea, 2006). Agassiz dedicated much of his life to collecting data and noting observations of marine biology, freshwater fish, embryology, and fossil fishes (Agassiz, 2008). His studies have contributed to the foundations of ichthyology, geology, and paleontology (Agassiz, 2008). Agassiz urged people to get outside and learn directly from nature (McCrea, 2006). Then, in 1891, an American educator named Wilbur Jackman defined the nature study movement in his book *Nature Study for the Common School* (McCrea, 2006). Jackman wrote the book as a guide for teachers to instruct their students adequately in Natural Science. He noted that there was a mistaken idea during that time period in that student interest was best supported by a thorough study of a few living things (Jackman, 1981). He rejected this thought stating that the whole subject of interest would become distasteful or tiresome to the student and/or they would become so closed off to the other parts of nature that are equally interesting and important (Jackman, 1981). He wrote "Animal, plant, mineral, river, cloud, sunbeam, mountain, physical and chemical changes are all matters of equal and absorbing interest to him, and if left to himself he will inquire as freely about one as another" (Jackman, 1981, p. iii). By increasing the breadth of exposure to nature and reducing the depth of study students may interact more openly with nature in order to make meaningful connections.

Though many people in the 1800's were interested in the environment and promoted education using nature, the term "environmental education" was not widely accepted or even part of the common language. Liberty Hyde Bailey was a notable writer, educator, botanist, and advocate for natural studies, yet he failed to use the phrase "environmental education" in his own writing because he felt that the phrase was

theoretical, arrogant, vague, and would always need an explanation (McCrea, 2006). In a biographical memoir about Bailey, Harlan Banks writes "He wanted to see the whole broad concept of nature study presented in a way that would bring students into harmony with nature" (Banks, 1994, p. 10). Bailey hoped that the teachers who were passionate and enthusiastic about nature would inspire their students (Banks, 1994).

One of the first people to make a link between the quality of the environment and the quality of education was Sir Patrick Geddes (Palmer, 1998). For some people, that was enough to give him the title as the founding father of environmental education (Palmer, 1998). His contributions to environmental education include opening the Outlook Tower located in Edinburgh, Scotland in 1892. This tower, which can still be seen today, was considered the original field studies center that aimed at bringing students in direct contact with nature (Palmer, 1998). Geddes named it "Outlook Tower" because he wanted to change people's outlook on their environment (National Library of Scotland, 2016). The top level of the tower had the theme of Edinburgh, the next level down was Scotland, then the language, Europe, and finally the world (NLS, 2016). During his tours, Geddes would first bring people to the top where he would use a camera to help people view their town and the holistic relationship it had with the surrounding countryside (NLS, 2016). As people traveled back down through the successive floors they saw how, starting at the local level, people can begin to make connections with the wider world (NLS, 2016).

In 1908, the American Nature Study Society was established by Liberty Bailey, along with Anna Botsford Comstock, Louis Agassiz, Wilbur Jackman, and others (McCrea, 2006). This group of individuals helped guide a movement motivated by the

mantra "study nature, not books." In a collection of nature-study leaflets, Bailey (1904) states:

> Nature-study, as a process, is seeing the things that one looks at, and the drawing of proper conclusions from what one sees. Its purpose is to educate the child in terms of his environment, to the end that his life may be fuller and richer. Nature-study is not the study of a science, as of botany, entomology, geology, and the like. That is, it takes the things at hand and endeavors to understand them, without reference primarily to the systematic order or relationships of the objects. It is informal, as are the objects which one sees. It is entirely divorced from mere definitions, or from formal explanations in books. It is therefore supremely natural. It trains the eye and the mind to see and to comprehend the common things of life; and the result is not directly the acquiring of science but the establishing of a living sympathy with everything that is (p. 11).

As seen in the description above, environmental education, as we know it today, has fundamentally been around for over 100 years, it has simply had a few different names and focuses. Throughout the early 1900's people were using "nature-study" to describe the movement aimed at getting children outside to interact directly with nature (Palmer 1998). In the 1930's, the United States experienced a major drought across the Great Plains. The impacts of this "Dust Bowl" sparked a conservation movement that made its way into the education system (McCrea, 2006). John Dewey led the progressive movement and focused mainly on promoting a more student-centered approach to education (McCrea, 2006). He encouraged practices that would lead to lifelong learning skills, learning by doing, and integrated and interdisciplinary teachings (McCrea, 2006).

By 1940, that had expanded to the rural studies movement where local associations were founded by rural studies teachers (Palmer, 1998). At this time, the phrase "environmental studies" was fairly common and was understood to include teaching elements of geography, history, and local nature study (Palmer 1998). In 1960, the National Rural Environmental Studies Association was formed which later became the National Association for Environmental Education and today is simply known as NAEE (Palmer, 1998). Another popular term used during the 1950's was "field studies," in which history, geography, and biology were all taught in the field (Palmer, 1998). This was supported by the establishment of the Council for the Promotion of Field Studies, now called the Field Studies Council (Palmer, 1998).

One of the first times that the phrase "environmental education" was formally recorded was at a 1965 conference located at Keele University in Staffordshire, Britain (Palmer, 1998). The conference was the first time that educationists and conservationists met for the purpose of examining the conservation of the countryside landscape and the implications it had on education (Palmer, 1998). In 1968 they established the Council for Environmental Education (CEE) and focused on three goals:

- Development: CEE aims to facilitate the development of theory and practice of environmental education.
- Promotion: CEE aims to promote the concept of environmental education and facilitate its application in all spheres of education.
- Review: CEE aims to monitor the progress of environmental education and assess its effectiveness (Palmer, 1998, p. 13).

The International Union for the Conservation of Nature and Natural Resources (IUCN), also known as the World Conservation Union, was established in 1949 and has also played an important role in defining environmental education and supporting the process (Palmer, 1998). In 1968, another organization called the United Nations Educational, Scientific and Cultural Organization (UNESCO) held a conference aimed at developing environmental curriculum for all levels of education (Palmer, 1998). Palmer points out (as cited in IUCN, 1970) that the IUCN and UNESCO meeting led to the widely accepted definition of environmental education:

> Environmental education is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture, and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behavior about issues concerning environmental quality. (Palmer, 1998, p. 14)

The following year, the National Environmental Policy Act of 1969 gets passed stating its purposes:

> To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality. (McCrea, 2006, p. 4)

Throughout the mid 1900's, the number of environmental organizations continued to grow. In 1970, the Office of Environmental Education (OEE) in the U.S. Department of Health, Education, and Welfare was formed. This OEE offered award grants to give teachers an opportunity to participate in professional development and design their own environmental education curricula (McCrea, 2006). In 1981, Congress eliminated the OEE and the underlying programs that it managed (McCrea, 2006). The first national Earth Day was celebrated on April 20th, 1970 by twenty-million people (McCrea, 2006) and it has been celebrated annually since then.

By 1980, the *World Conservation Strategy* was introduced, which was another major initiative that focused on conservation through sustainable development (Palmer, 1998). Yet another key international conference was held by UNESCO and United Nations Environment Program (UNEP) in Moscow in 1987. Here, the nations examined the importance of environmental education. The main theme of the conference is summarized by the opening address:

> In the long run, nothing significant will happen to reduce local and international threats to the environment unless widespread public awareness is aroused concerning the essential links between environmental quality and the continued satisfaction of human needs. Human action depends upon motivation, which depends upon widespread understanding. This is why we feel it is so important that everyone becomes environmentally conscious through proper environmental education. (Palmer, 1998, p. 19)

Despite the various organizations working together and the many international conferences that have been held with the goals to define environmental education, create curriculum for all ages, and support the implementation of the formal education, we do not see environmental education being taught in many schools. In the 1990s, the National Foundation for Educational Research (NFER) conducted many research projects regarding environmental education. The results of these studies include:

- The majority of school managers saw environmental education as either 'quite' or 'very' important part of the school curriculum. A small minority of schools saw it as essential.
- Only 7% of schools had produced a specific environmental education policy. Forty-two percent had no environmental education of any sort.
- Less than 25% of schools had a coordinated, cross-curricular approach across many subjects. Geography and science curricula were used as the main vehicles for environmental education. Seventy-five percent of schools also used their personal and social education curriculum.
- The main constraints were identified as: lack of timetable time (because of the need to meet statutory requirements); lack of resources; lack of staff expertise; lack of staff motivation. Other needs identified were teacher training and increased resources to deliver environmental education (Palmer, 1998, p. 26).

Even with the unsettling data represented above, there are many individuals and organizations who continue to fight for better environmental education and literacy in our schools. The future of this planet depends on today's youth and their understanding of human impact on the world around them. Every few years, these organizations publish

new resources which contain the refined goals and updated standards that environmental educators can use to reach these students.

Environmental education is more important now than it has ever been, yet many schools do not have any formal environmental education available to students. There are increasing amounts of environmental issues worldwide including human population growth and urban sprawl, availability of natural resources, biodiversity, water quality, pollution, energy use and sources, climate change, and sustainability, yet there are few students being formally exposed to these issues. In some high schools, only a small percent of students are exposed to environmental education and it is often only if they chose it as an elective course. Smaller schools and those without access to necessary resources may not even offer an environmental studies course.

Environmental Education Academic Standards of Minnesota

The Minnesota K-12 Academic Standards in Science were last revised in the year 2009 (Minnesota Department of Education [MDE], 2016). These standards are based upon the belief that all students ought to be scientifically literate; meaning they can use scientific principles and processes in order to make educated personal decisions and be able to discuss scientific issues affecting society (MDE, 2016). The legislative mandates and requirements addressed in these standards include:

- K-12 standards and grade-specific benchmarks: State law requires the commissioner to develop K-12 academic standards and benchmarks

- College and work readiness: In each subject area, the standards and benchmarks must be aligned with the knowledge and skills needed for college readiness and advanced work.
- Technology and information literacy: Technology and information literacy standards must be embedded into the state standards, including standards from Minnesota Education Media Organization (MEMO), International Society for Technology in Education (ISTE), and the International Technology and Education Association (ITEA).
- Minnesota American Indian Tribes and Communities: The updated standards must include contributions of the Minnesota American Indian tribes and their communities as they related to the academic standards
- Environmental Literacy: These standards must be in compliance with the Minnesota Statutes, section 115A.073, which aims to have pupils and citizens apply informed decision making skills to maintain a sustainable lifestyle (Kennedy & Stromme, 2008). The resources accessed by the standards committee include GreenPrint for Minnesota and the Environmental Literacy Scope and Sequence (MDE, 2016).

The committee that developed the academic standards for science in Minnesota reviewed two very important documents. *A GreenPrint for Minnesota: A state plan for environmental education* was prepared by the Minnesota Pollution Control Agency (MPCA) and the Minnesota Environmental Education Advisory Board (EEAB) (Kennedy & Stromme, 2008). The original environmental education plan for Minnesota was written in 1972 (Kennedy and Stromme, 2008). Since then, the plan has been

revised three times: in 1993, 2000, and 2008. The current GreenPrint plan focuses on guidance to those helping Minnesota citizens achieve the state goals for environmental education so that they can ultimately attain environmental literacy (Kennedy & Stromme, 2008). The third edition has given special attention to today's leading challenges, and has prioritized the desired outcomes for environmental education listed below:

1. Minnesotans have the knowledge, skills, and attitudes to make individual and collective lifestyle choices that support a sustainable environment.
2. Environmental education in Minnesota is of the highest quality and is ensured through the development of standards and common definitions.
3. Minnesota academic standards include Minnesota Environmental Literacy Scope and Sequence Benchmarks across ALL disciplines and grade levels.
4. Minnesota has a dedicated sustainable funding mechanism for environmental education of all ages and audiences (Kennedy & Stromme, 2008, pp. 10-11).

The second document reviewed by the standards committee, *Environmental Literacy Scope and Sequence: Providing a systems approach to environmental education in Minnesota*, also provided a framework and direction for the committee to follow. The document was put together by the Minnesota Office of Environmental Assistance (OEA) in partnership with Minnesota Department of Children, Families and Learning (DCFL), GreenPrint Council, Blandin Foundation, and the State Environment and Education Roundtable (Landers, Naylon, & Drewes, 2002). The scope, or vision, of what students should have achieved at the end of their learning experiences is this:

> The Earth is a set of interactive natural and social systems. An environmentally literate person must understand the relationship of the parts of a system and the

> interdependence of human and environmental systems. The content of environmental education is the exploration of the relationships between social and natural systems (Landers et al., 2002, p. 6)

The benchmarks of the Minnesota K-12 Academic Standards are sequenced to add new knowledge on top of the prior knowledge. A successful environmental education program uses the foundational benchmarks to help build the curriculum and expand the learning experiences for the students. An example of this expansion can be seen in the environmental literacy benchmarks listed below:

- Grades preK-2: Social systems and natural systems are made of parts.
- Grades 3-5: In social and natural systems that consist of many parts, the parts usually influence one another.
- Grades 6-8: Social and natural systems can include processes as well as things. The output from a social or natural system can become the input to other parts of social or natural systems
- Grades 9-12: Interaction between social and natural systems is defined by their boundaries, relation to other systems, and expected inputs and outputs. Feedback of outputs from some parts of a managed social or natural system can be used to bring it closer to desired results (Landers et al, 2002, p. 10).

The Minnesota Department of Education's current academic standards in science are organized by grade level into "four content strands: 1) The Nature of Science and Engineering, 2) Physical Science, 3) Earth and Space Science, and 4) Life Sciences. Each strand has three to four *substrands*. Each substrand contains two or more *standards*

and one or more *benchmarks"* (Minnesota Department of Education [MDE], 2010, p. 1). One of the benchmarks that targets the environmental literacy in the high school curriculum follows this level of organization:

- Strand 4: Life Science
- Substrand 4: Human Interactions with Living Systems
- Standard 1: Human Activity has consequences on living organisms and ecosystems.
- Benchmark 2: Describe the social, economic, and ecological risks and benefits of changing a natural ecosystem as a result of human activity. For example: Changing the temperature or composition of water, air or soil; altering the populations and communities (MDE, 2010, p. 40).

Each strand of the Minnesota Academic Standards has a substrand that focuses on the human interactions with that strand topic. Each of these standards and benchmarks addresses the goals and plan according to the Minnesota Statute 115A.073 which again states that "Pupils and citizens should be able to apply informed decision making processes to maintain a sustainable lifestyle" (Landers et al., 2002, p. 4).

Summer Field Based Science

The Summer Field Based Science (FBS) course was designed by Eric Burfeind, science educator at a high school located in a Western suburb of Minneapolis, Minnesota. Burfeind's goal with this program was to encourage high school students to learn about natural and social systems of Lake of the Woods, Minnesota and Canada through experiential education (Burfeind, 2016). The first year that the course ran, 2008,

Burfeind brought seven students with him up to Laketrails Base Camp on Oak Island in Lake of the Woods. Those seven students must have found the trip fulfilling and worthwhile. It did not take long for more students to hear of this unique opportunity and express their desire to participate. The enrollment numbers doubled the second year and doubled once again the year after that. Due to the course's popularity, the school has been bringing the maximum number of 55 students since 2012.

Students who enroll in this course participate in classroom sessions where they learn about Minnesota's native plants and wildlife, weather patterns/indicators, and astronomy prior to going on their camping trip. The high school has formed a trusted partnership with Laketrails Base Camp out of Oak Island, MN. The high school students are split into smaller groups comprised of approximately eight students, one teacher's assistant (a former FBS student), one science teacher, and two Laketrails employed guides who are trained to navigate the ins and outs of the Lake of the Woods territory. Together, the people in these small groups plan for a six day-five night, unique canoe trip experience. They must assemble their trip itinerary which accounts for their canoeing, portaging, and campsite choices, the entire menu for their trip away from Oak Island, and their plan for how they will carry out the investigation of/experiment on a natural system of their choice.

Laketrails was started by Father Bill Mehrkens who was an Assistant Pastor of the Cathedral parish in Crookston, South Dakota. Fr. Bill's dream was to create a wilderness program for high school aged students that would include an extensive canoe and boating program (Laketrails Base Camp, 2015). Fr. Bill had an opportunity to offer Mass on Oak Island in the Northwest Angle of Minnesota. Excitedly, Fr. Bill accepted and saw this as

an opportunity to check out the area to see if he could turn his wilderness camp into a reality. In October of 1951, he got the "green light" to begin planning for the Laketrails camp on Oak Island. Though the program has evolved in the 60+ year history, the philosophy of this camp is simple and has stayed the same. On the Laketrails website, it states:

> Living is an art. At Laketrails we believe we're teaching a way of life-living and learning together. So, does this life—this program—do anything for young people? We feel strongly that it does. It is difficult to verbally communicate the value of the arts. Is it possible to explain the beauty of a picture, a piece of music, or a sunset? These things have to be experienced to be appreciated. In the same way, a way of life as to be lived to be understood. Closeness to natural beauty and the basic elements of biological life, the achievement of skills learned, companionship-laughing, singing, playing, working, and praying together—these are some of the things that make up our way of life. We know this way of life carries an educational impact that is hard to surpass. (2015)

Exposing more young people to nature may lead to a greater appreciation for the land and the organisms that surround them. A unique experience such as the Summer Field Based Science course may influence people to be more aware of their personal impacts on the environment and to make more sustainable choices within their communities. It may lead to stronger relationships with people who are also passionate about the issues we are facing on this planet. People may feel that they *can* make a difference in sharing their knowledge with others and by making small changes in their

own lives. Though the future of life our planet is unknown, the fact is that we are limited in space and natural resources, but by providing more positive outdoor learning opportunities for young people, we may see an increase in the sustainable use of resources and a better, brighter future.

Benefits of Experiential-Based Learning

Experiential-based learning opportunities provide numerous benefits to the learner and to their communities. When people think back on memories from their childhood, they typically think of an activity or an event that took place in their backyard or outside with their family or friends. Rarely would we find someone who would describe a memory that involves a classroom setting, sitting in a desk, or passively listening to a teacher discuss a new topic. Why is this the case? The *experiences* that we had as children provided us with opportunities to be creative and to actively engage with our surroundings and the people who were there with us. In his article titled "Twilight of the Lecture" Craig Lambert, a staff writer and editor for *Harvard Magazine*, wrote that "learning is a social experience" (2012, p. 27). Imagine the kindergarten classroom where the student desks are arranged facing each other in small pods so that they are able to work as a group on an activity. Lambert says this is "no accident—*that's how we learn*" (2012, p. 27). In the cognitive science, learning is defined as "a process of moving information from short-term to long-term memory; assessment research has proven that active learning does that best" (Lambert, 2012, p. 25). The reason why people can recall an active childhood experience, rather than a passive classroom experience, is because that is how we are wired to learn.

Unfortunately, as students move through the educational system there is a shift in what the classroom looks like. Infants and toddlers learn by actively engaging with toys and objects, but as children move into primary school, they begin having fewer active learning experiences and more passive experiences. Many classrooms in secondary education buildings have student desks placed in rows, all facing forward, with the teacher and projector at the front of the classroom. All educators want their students to learn, but "sitting passively and taking notes is just not a way of learning. Yet lectures are 99 percent of how we teach!" (Lambert, 2012, p. 26). If educators want their students to truly *learn* and be able to recall their experiences later in life, there needs to be a shift in the pedagogy. Lambert also stated "interactive learning triples students' gains in knowledge" (2012, p. 24). He goes on to say that this "form of interactive pedagogy turns the passive, note-taking students into active, de facto *teachers* who explain their ideas to each other and contend for their points of view" (2012, p. 24). Eric Mazur, former professor at Harvard University, said that "the person who learns the most in any classroom is the teacher" (Lambert, 2012, p. 24). Transforming the look of the classroom and the methods of instruction by incorporating more hands-on, interactive learning opportunities will allow the students to become the teachers to each other and facilitate a deeper understanding of the lessons being taught.

The active, discovery-based learning not only increases the depths of student understanding, it also impacts the student's sense of ownership in his or her learning (Trattner, 2015). Lisa Trattner, assistant editor of *Science Activities*, said "When analyzing the effectiveness of discovery-based active science learning, it is evident that students comprehend more scientific knowledge, acquire a love of science as a discipline,

and make better connections and applications to real-life learning. These skills are the essence of what scientific learning should be in the twenty-first century" (2015, p. 53). When students can connect the subject matter directly to their experiences, projects, and goals, they will care more and be more motivated to learn (Lambert, 2012).

Additionally, experiential-based learning facilitates the cognitive development process of young people. A professor of social ecology from Yale University, Stephen Kellert, has talked about how experiencing nature can help shape children's cognitive maturation, including how they analyze, synthesize, and evaluate information (Louv, 2005). Exposing children to nature may encourage them to ask questions such as: Why is the sky blue? What is the relationship between the Cardinal and the tree? Why do some animals eat plants while others eat other animals? Naturally occurring objects and processes are often overlooked because we don't spend the time to sit back, observe, and wonder. The environment gives students direct access to the material being learned and can help stimulate curiosity and critical thinking skills (Slattery, 2001). Fortunately, there are so many different types of activities and areas outside which students can explore.

Another benefit to experiential-based education is that students can be more exposed to the outdoors, which can encourage students to stay active and healthy. Fresh air is essential for maintaining the health of our body and our brain (Paloni, 2007). By increasing the amount of time spent outdoors it means that students are moving around, increasing blood flow, and bringing more oxygen in their brains which can help support their cognitive function for the rest of the day (Paloni, 2007).

The various environmental issues facing the world today (e.g. climate change, the global water crisis and food security, pollution, forest degradation, etc.) are complex and demand attention (Heinrich, Habron, Johnson, & Goralnik, 2015). By engaging students in experiential-based learning opportunities which promote critical thinking skills and meaningful connections to these issues, educators can promote active citizenry and stewardship (Heinrich et al., 2015). In an article titled "Natures New Educational Mandate: No Child Left Inside," Jodi Paloni, quotes Thomas Berry saying "Teaching children about the natural world should be treated as one of the most important events of their lives" (2007, p. 2). Indeed, the children of today are the ones who need to know about the natural world and the global issues so they can promote a positive change for the future of this planet.

Finally, an important, yet often overlooked, aspect of environmental education is experiencing the history of the natural environment surrounding us. Deirdre Slattery suggests that the average human lifespan is approximately 75 years, which is very short in comparison with natural processes (2001). If we are able to focus on the role of time in the environmental landscape, then we might be able to put things into perspective and develop a bit of humility, noting how small we, as humans, actually are. Slattery notes that students were better able to observe, understand and explore after having the knowledge and appreciation of the history of the natural landscape (2001). Putting time into perspective like this is a useful way of increasing the various types of experiences in outdoor education. It allows us to enrich our understandings and discover more using research, stories, and our imaginations. We can learn to have a deeper appreciation for

the places that have been altered by humans and those areas which are still considered pristine (Slattery, 2001).

Hindrances to Environmental Education

Though experiential-based, environmental education opportunities are shown to have significant benefits to young people, there are hindrances that prevent students from having such experiences. Several factors influence this including an increase in the value placed on standardized tests as an attempt to close the achievement gap (Galloway-Thoele, 2015) which is supported by the school systems' focus on achievement of arbitrary objectives. There is also a lack of teacher training regarding effective environmental education as well as groups of individuals who outwardly oppose environmental education because of the political associations and the non-scientific sources of information out there (Galloway-Thoele, 2015).

The two largest and most notable hindrances to teachers implementing experiential-based learning opportunities for children include a lack of time, as sensed by the educator, and the space to implement it. The No Child Left Behind (NCLB) Act, established in 2002, has been impacting the way students learn in the classroom. The goal of NCLB was to help schools in America close the achievement gap by implementing national standards and measuring a schools progress through the use of standardized tests. Schools are held accountable by implementing standardized tests annually for math and reading and the schools must make "adequate yearly progress, or AYP, in order to receive funding by the state. If the schools do not make AYP for two consecutive years, students are given the option to transfer to another school with better performance" (GreatSchools, 2016). In order to help guide schools towards making

AYP, many schools use objectives to help them measure achievement of their students. Objectives are viewed as directives in the rational approach to education (Eisner, 1983). Elliott Eisner, a professor of the Arts at Stanford University, said that sometimes these objectives can obstruct the desired outcome. In his paper titled "Educational Objectives: Help or Hindrance?" Eisner wrote:

> The method of forming creative insights in curriculum development, as in the sciences and arts, is as yet not logically prescribable. The ways in which curriculums can be usefully and efficiently developed constitute an empirical problem; imposing logical requirements upon the process because they are desirable for assessing the product is, in my mind, an error (1983, p. 558).

Though the intentions of establishing curriculum objectives and standardized tests are positive in that they aim to close the achievement gap, the impact that these have had on schools across the country have been negative. Because there is a greater focus on achieving high scores, more teachers are spending the majority of their instructional time using teacher-centered approaches to address the concepts on which the students will be tested. Kathreen Harrison, a classroom teacher and blog writer, wrote "Teachers are saddled with back-to-back classes and have almost no time to connect with individual students. Scheduling literally allows almost no time for reflection on how best to meet student needs" (2013). Teachers feel so overwhelmed by their duties within the school day that they do not have the time to plan for and incorporate those valuable experiential-based learning opportunities into their lessons. As stated before it is the active, hands-on, discovery-based learning that increases the depth of understanding (Trattner, 2015) in our

students, so many educators are actually doing a disservice to their students by using the teacher-driven lessons in order to cover the broad range of curriculum objectives.

The other major hindrance to these valuable experiential-based learning opportunities is the lack of space that can be utilized by the educators. Dr. George Davis, professor at Moorhead State University, wrote a journal article titled "Standards-Based Education and Its Impacts on Environmental Education" in which he states:

> Environmental education must contain substantial and appropriate experiences in the natural and human impacted environments. Many of the environmental education outcomes cannot be achieved in the four walls of the regular classroom. Some experiences need to be gained in the students' urban community, including city parks, school yards, sewage treatment plants, etc., as well as truly natural outdoor sites away from the city. Today's K-12 students do not generally have rich experiences investigating their outdoors, whether it is in their city or a natural area away from the city (2000).

This statement ties back to the lack of instructional time that a teacher feels they have, which leads to a decrease in the likelihood that educators will take the time to bring their students outside of the classroom in order to directly connect with their environment. Children spend eight hours each day, five days per week, in school. The majority of their awake time is spent sitting at a desk inside a school classroom. The responsibility of getting more students outside to interact with nature falls heavily on classroom teachers, yet they feel unequipped to implement the change.

The notable lack of experiential-based environmental education in our school system may also be due to a lack of pre-service training for formal educators. In order to

support and encourage more classroom teachers to incorporate these necessary hands-on experiences into their lesson plans, there needs to be more of an emphasis on training *prior* to them obtaining a classroom teaching position. Dr. Davis said that "If we want to realize our dream of environmental education as a mainstreamed hardwired, integrated part of a standards-based curriculum, we have to make a fundamental change in how we prepare teachers to deliver environmental education instruction" (2000). Davis has worked with nine different universities in Minnesota to design a pre-service environmental education program (Davis, 2000). He notes that an effective environmental education program must be:

1. constructivist-based and developmentally appropriate
2. interdisciplinary and connect with other knowledge and skills
3. ecologically based
4. based on a local ecoregion, yet must be able to expand to the global level
5. inclusive of substantial and appropriate experience in natural and human impacted environments
6. inclusive of significant inquiry-based experiences for students
7. able to bring students to develop environmental aesthetic and ethic that helps form the basis of personal commitment to action (2000).

By implementing an environmental education program for pre-service teachers, there will likely be a greater impact on the future of classroom practices, including an increase in hands-on environmental education.

There are few known critics of environmental education who have influenced some people to feel that environmental education may not be beneficial to our children.

Michael Sanera and Jane Shaw published a book in 1996 titled *Facts, Not Fear: A Parents' Guide to Teaching Children About the Environment* in which Sanera and Shaw claim that the most widely available environmental education materials are factually inaccurate and one-sided (Smith, 2000). In their opinion, environmental educators need to focus more on the science and economics of environmental issues and they need to avoid reference to connections existing between environmental problems and social/cultural factors (Smith, 2000).

Critics like Sanera and Shaw are typically associated with organizations that are responsible for environmental destruction and pollution (Smith, 2000). These destructive organizations often have misleading names such as The Center for Environmental Education Research, which leads many to believe they are *for* environmental education, not against it. Fortunately, the research performed by the environmental education critics has been shallow and small-scale (Smith, 2000). Unfortunately, however, their audience has been the general public, which can be easily influenced, and has resulted in the distrust of environmental education (Smith, 2000).

Despite such opposition, there are true environmental education efforts and state curriculum standards that are helping to disprove the allegations of the critics (Galloway-Thoele, 2015). Organizations like the Citizens for Environmental Education (CEE) have been created, with support from the Audubon Society, and they have been able to publicly expose Sanera's research (which lacks classroom observation, yet includes extensive and systematically conducted interviews) and counteract the ill effects it has had on the general public's understanding of environmental issues (Smith, 2000).

Conclusion

Environmental education has evolved over the course of the last century, but one theme has remained consistent throughout: experiential, discovery-based learning is powerful in that it can have a greater positive impact on student learning than the traditional teacher-centered education practices. The benefits of experiential education reach far beyond an academic score or grade. In fact, hands-on learning allows all individuals to take ownership of their own learning and it provides them an opportunity to make meaningful connections to the world around them.

When one is directly connecting with the surrounding environment, they may develop a passion for the environment and want to help protect it in any way possible. Feeling connected makes us feel useful and that our voice matters. Students who get to experience hands-on learning may be more likely to reach out and help teach others or become active participants in groups or organizations that support their missions. There are, however, hindrances that have prevented experiential-based learning opportunities from reaching every child. There is still a lot of work to be done before each student will have these rich, hands-on learning experiences, but advocates for environmental education are continuing their efforts in ensuring it happens in the future.

In the next chapter, I will introduce the community where my study took place, the rationale for my research, and the specific methods taken to address the question, "What are the impacts of an experiential-based learning opportunity?" The research study will examine the relationship between an experiential-based learning opportunity and the students' behaviors and attitudes as they relates to the environment, their communication skills, and their confidence in themselves.

CHAPTER THREE

Research Methods

Overview

In this chapter I will discuss the process used to investigate the question "What are the impacts of an experiential-based learning opportunity?" First, I will highlight the purpose and hypothesis of my research study. Then, I will examine the demographics of the community to which the research participants belong and describe the background of the participants themselves. Next, I will explain the methods used to collect and analyze the data for this research paper. Finally, I will explain why this investigation is worthwhile, citing published research.

Purpose and Hypotheses

The larger question that I am seeking to answer through this study is "What are the impacts of an experiential-based learning opportunity?" This question was derived after reflecting on my own field-based experiences and the long-term impact that each of my experiences has had on me in addition to reading about the benefits of experiential learning. My hypotheses are as follows:

1. If high school aged students participate in a field-experience course then they will develop a greater appreciation and respect for the environment because the direct

exposure will help them to make meaningful connections to the world around them.

2. If high school aged students participate in a field-experience course then they will demonstrate personal growth, in terms of self-confidence, because they will be challenged to step outside their comfort zones while being supported and encouraged.
3. If high school aged students participate in a field-experience course then they will become more effective communicators because they will spend more time talking to people face-to-face and will have to work together to overcome challenges.

Demographics

The community in which the research participants reside is located in a Western suburb of Minneapolis, Minnesota. The high school has approximately two thousand students enrolled in grades ten through twelve who are supported by roughly one hundred and fifty staff members. The district's most recent annual report available to the public (2014-15) states that eighty-six percent of students enrolled in all schools (elementary, middle, and high school) reside within the community, while the remaining fourteen percent of students have open-enrolled from other communities. Nine percent of the students in the district qualify for free and reduced lunch. Nearly ten percent of the students receive special education services. Four percent of the students receive English language learning services. Twenty-one percent of the students in this district are students of color. The district's website highlights the ninety-nine percent graduation rate, with ninety-four percent of the graduates pursuing some sort of higher education. Education and community service are held in high regards throughout the community.

This community's members are supportive of the schools within the district and many retirees are active participants and volunteers at school events. There are several partnership programs within the district including the Chamber of Commerce, Connecting with Kids, and the local Public Health Department. Many high school students volunteer at the elementary schools helping the young students learn how to read. People of all ages in this population work together in order to make this community a desirable district to be a part of.

Participants

The participants of this study were the high school students who were enrolled in the 2016 summer Field Based Science (FBS) course. All of the students enrolled in the course were minors (ages 16-17 years old) and therefore required parent consent in order to participate. The participation in this study was completely voluntary and the students were not penalized in any way if they, or their parents, chose not to participate. Of the 41 students enrolled in the summer elective course, 29 students had parent permission and volunteered to participate in the Pre-Trip Survey (11 males, 18 females). Only 20 of the 29 participants of the Pre-Trip Survey completed the Post-Trip Survey.

Methods

Prior to starting the research process, it was necessary to receive approval from the Hamline University- Human Subject Committee (HU-HSC) due to the fact that the potential participants were minors at the time of the study. After receiving approval from the HU-HSC, a letter of introduction and parent consent form (see Appendix A) was sent to the parents of all students enrolled in the 2016 summer FBS course. Upon receiving

the signed parent consent forms, it was noted which students were eligible to participate in the surveys.

On the morning of July 17, 2016, I met the 41 FBS students (along with the course instructors and teacher's assistants) at the high school as they were preparing to depart for their camping and canoe trip in Lake of the Woods, Minnesota. A paper copy of the Pre-Trip Survey (see Appendix B) was distributed to the 29 students who were eligible to participate. A survey was not given to any of the students who did not have a signed parent consent form. After approximately 20 minutes, the completed surveys were collected and the students departed for their field experience in Lake of the Woods. The purpose of the Pre-Trip Survey was to obtain background information on the students in terms of their general interest in science and the environment and for them to share their personal history of participating in outdoor activities and/or field experiences. Additionally, students responded to 11 statements using the Likert Scale that were used to evaluate their opinions on statements regarding their confidence level, awareness of their environmental impact, ability to communicate, and general interest in the outdoors. These responses from the Pre-Trip Survey were later compared to their responses to the same statements on the Post-Trip Survey.

On September 6, 2016, an email (see Appendix C) was sent to the participants of the Pre-Trip Survey asking them to complete the Post-Trip Survey (see Appendix D). This was approximately six weeks after the students returned from the field-experience trip. The timing of this survey was intentional—I wanted some of the excitement and novelty of their experience to wear off, but I didn't want the experience to get lost in the shuffle associated with the new school year. In the email, students were reminded that

their participation was voluntary and that their responses were completely anonymous and confidential. The Post-Trip Survey was in the format of a Google Form. Students were provided a link to the survey and allowed two weeks to complete it. Of the 29 Pre-Trip Survey participants, 20 students followed-up and completed the Post-Trip Survey. I did not send out a consent form between the Pre-Trip Survey and the Post-Trip survey which meant that any student who did not participate in the Pre-Trip Survey was unable to participate in the Post-Trip Survey.

The Surveys

The surveys used in this study aimed at collecting qualitative data. The Pre-Trip Survey asked students to rank their level of interest in the core subject areas at school, identify how often they camp on average each year, identify their family's frequency of outdoor activity, and rank their general interest in pursuing a science related career. Additionally, students were asked to use the Likert Scale (1 = strongly disagree up to 5 = strongly agree) to reflect on statements that were used to examine their level of confidence in themselves, interest in the environment and time spent outdoors, ability to communicate, and preferred learning environment. Students were also asked to share any prior participation in field-experience course(s) and why they chose to enroll in the Summer Field Based Science elective course.

The Post-Trip Survey included three of the same questions used in the Pre-Trip Survey along with new questions that asked students to reflect on their experience. The first question asked students to again rank their interest of the core subject areas. Then, students completed the same reflective statements using the Likert Scale that were seen in the Pre-Trip Survey. Additionally, the students were asked to share their general interest

in pursuing a career in science. The purpose of repeating these questions was to compare the results and see if the field-experience course had an impact on student interest in science, awareness of their environmental impact, communication skills, and self-confidence. On the Post-Trip Survey, students were asked to reflect on their camping experience and to openly share how it impacted them. Finally, they were asked if they would recommend this course to their peers and explain why or why not.

Data Analysis

The first step in analyzing the data was to manually input the data sets into Microsoft Excel Spreadsheets. The student responses to the questions regarding their prior experiences in nature provided the background information about the students' general interest level in science as well as how familiar they are with camping/outdoor activities.

Due to the fairly small sample size and the incongruent number of participants of each survey, the data will be presented in percent of total responses. When comparing the Pre-Trip and Post-Trip survey responses, again, the data will be presented as a percent of total responses. A change in the percent of each response may indicate a student has changed his/her opinion after having the field-experience.

The Post-Trip Survey provided a space for students to type openly about the impact that the FBS experience had on them. Because all of the data collected was qualitative, I used a common qualitative data analysis procedure called "coding." The procedure that I used for coding the data was found in "Chapter 9: Qualitative Procedures" of John Creswell's book *Research Design* (2009). First, Creswell suggests

collecting the raw data, organizing it, and then reading through all of it to see the whole picture. After that, he suggests reading through the responses again, noting the common themes throughout the comments. I followed his suggestions and identified several themes in my data including: personal growth, appreciation for nature, relationships, human impact, and survival skills. After highlighting the text using different colors for each of the identified themes, I was able to import the data into the MaxQda website, which helped facilitate the data analysis process. The data will be reported in percent of total student responses for each of the noted themes.

Rationale

Now, more than ever, it is important to encourage young people to get outside and engage with nature. Technological advances have been tremendously helpful in the last few decades, but with so many handheld technologies, games, and videos available at our fingertips, we are seeing fewer youth engaging with the outdoors and seeking out environmental education opportunities. The results of a study conducted by the Kaiser Family Foundation showed that youth ranging in age, eight to eighteen years old, spend an average of seven hours and thirty-eight minutes on entertainment media in a single day (Roberts, 2005). It is astonishing that nearly one-third of this population's day could be spent engaging in screen time. Young people are at risk for losing the capacity to learn directly from nature (Driessnack, 2009).

It is not only important for students to interact directly with nature for their own development, but also because as they grow up, their personal connection with the environment may inspire them to make a difference in the environmental issues facing our planet. Odom Fanning (2002) wrote in *Opportunities in Environmental Careers* that

"because of the environmental challenges facing the nation, it is important that the public have the knowledge to actively participate in solving the problems we face in regards to the environment" (p. 10). If we can encourage young people to interact with nature at a young age, they may feel driven to help protect the environment and make a difference in their communities.

Conclusion

The community in which this research study was conducted is a large city located in the Western suburbs of Minneapolis, Minnesota. The total number of participants of the study included 29 students, 11 males and 18 females, ages 16 to 17 years old. The participants completed a Pre-Trip Survey just prior to their departure for the canoe and camping adventure. Then, they completed the Post-Trip Survey approximately six weeks after their field-experience course. The intent of the Pre-Trip Survey was to gauge their background experience and interest in science and to measure their opinions on environmental behavior and personal attitudes. Three of the Post-Trip Questions were repeated from the Pre-Trip Survey so that I could compare/contrast the results from the two surveys and identify any notable changes.

In the next chapter, I will examine the results of my survey questionnaires. I will be using a qualitative analysis of the Pre-Trip and Post-Trip Surveys. Notable changes in the student opinions may indicate that the Summer FBS course impacts students' environmental awareness, personal growth, and ability to communicate effectively with others.

CHAPTER FOUR

Results

Overview

In this chapter, I will examine and discuss the data collected via two different surveys that were designed to help answer the question "What are the impacts of an experiential-based learning opportunity?" I will be specifically looking for data that will support or reject my three hypotheses which state that students who participate in an experiential-based learning opportunity will develop a greater appreciation for the environment, note personal growth, and demonstrate effective communication skills.

Participant Background

The participants of this research study include a total of 29 students who were enrolled in a high school level field-experience elective course. There were 11 male and 18 female respondents to the Pre-Trip Survey. Only 20 of the 29 original respondents participated in the follow-up Post-Trip Survey. Their names and sexes were not reported on the anonymous Post-Trip Survey. The survey began with a question that examined why students enrolled in this elective course. After reading through all of the responses, I grouped their comments into four themes including: I enjoy camping/outdoors, it sounded fun/interesting, it was recommended by a friend, and I wanted to challenge myself/try something new. Some students noted more than one reason for enrolling in the course.

Each reason was considered out of the 27 total completed surveys. There were two students who did not complete the back side of the survey, so the percent values were based on the 27 responses to those questions. The main reason why students decided to enroll in the course was because they claimed to be interested in camping or the outdoors—this was seen in 70% of the responses. Additionally, 41% of students thought that the FBS course sounded like it would be interesting or that it sounded like fun. Thirty-three percent of the students reported wanting to challenge themselves with a new experience and 11% reported that the course was recommended by a friend of theirs who had previously participated in the course (See Figure 1).

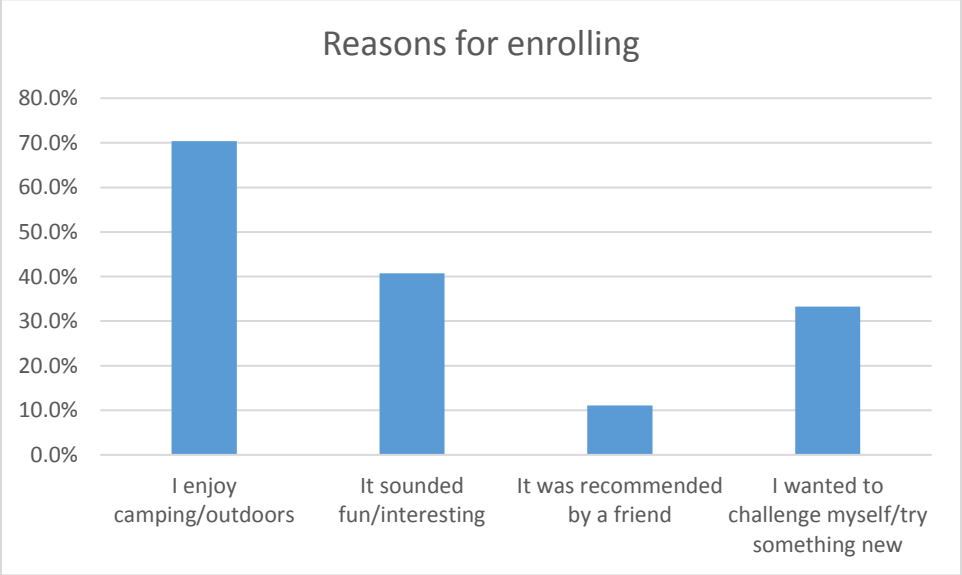

Figure 1: Reasons for enrolling in the FBS course

On the Pre-Trip Survey, 48% of the students ranked science as the core course they were most interested in, while 7% reported that science was the course they were least interested in. When asked how many times they go camping each year, 86% of students responded that they camp 0-2 times/year, 10% of students responded that they camp 3-4 times/ year and 3% of the students responded 5-6 times/year. This tells me that

the majority of participants have had little annual camping experience prior to the field-experience course (see Figure 2).

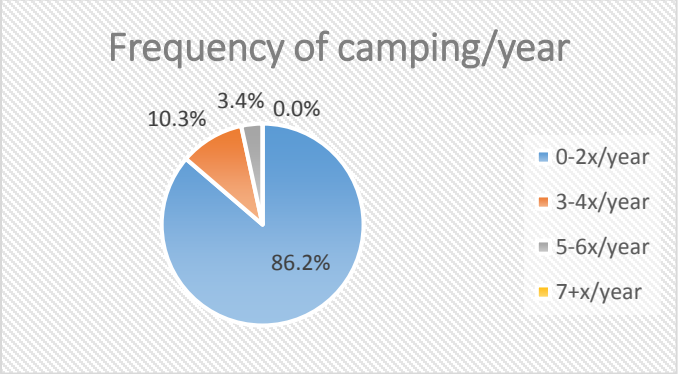

Figure 2: Frequency of camping each year

One question on the Pre-Trip Survey asked students to select a statement that most closely matched their personal interest in pursuing a career in the scientific field. A total of 83% of students reported having at least a slight interest in a science related career (see Figure 3).

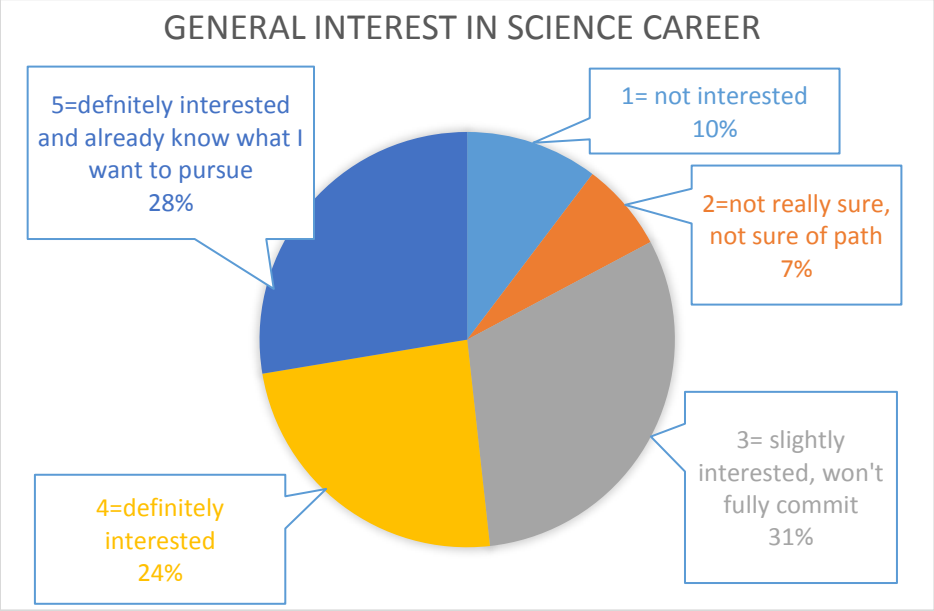

Figure 3: Students' general interest in a science-related career

Of those who were interested in science, I asked which science field they were most interested in. The top choices included medical science at 28% of the marked responses, natural science and environmental education at 20%, and biology at 22%. Students were also asked about their immediate family's involvement in outdoor activity which may include, but was not limited to, camping, fishing, hiking, skiing, and birding. Over half of the students, 55%, reported that their immediate family participated "often or at least once/week in an outdoor activity." Finally, when asked if students had ever participated in a field-experience course or camp prior to enrolling in FBS. Of the students who responded to this question, 85% said no, they had never participated in any other field-experience classes. The other 15% listed experiences such as fishing in Canada, Kayaking with a guide, Deep Portage Outdoor Activities, and Camp Lake Hubert as their prior experiences. Using this background information, it seems that most students were generally interested in and open to learning about science and that most of them had had *some* level of outdoor experience but few of them considered their outdoor experiences to be a formal field-based experience.

Impact of Experiential-Based Learning Opportunity

In this section, I will be comparing the results of the Pre-Trip Survey to the same questions that were answered on the Post-Trip Survey. The focus of the analysis is to support or reject my hypotheses in which I predicted that students would walk away from the field-experience having a greater appreciation for nature, a feeling of personal growth, and a feeling that they are more effective at communicating with others.

One of the questions on both of the surveys asked students to rank their opinion on eleven different statements. They were asked to use the Likert Scale, which had them

weigh in on how well they related to the statements by checking the box under strongly disagree, disagree, neutral, agree, or strongly agree. I grouped two of the eleven statements ("I enjoy camping" and "I enjoy spending leisurely time outdoors") together to examine the general level of interest in nature/the outdoors. On the Pre-Trip Survey, 33% of the students responded with a "strongly agree" about the statement "I enjoy camping" which grew to 80% of students on the Post-Trip Survey. The data also showed an increase in the students' interest in spending leisurely time outdoors from 46% on the Pre-Trip Survey to 73% on the Post Trip Survey (See Figure 4). These positive changes indicate that students were more interested in spending time outdoors after a field-experience class.

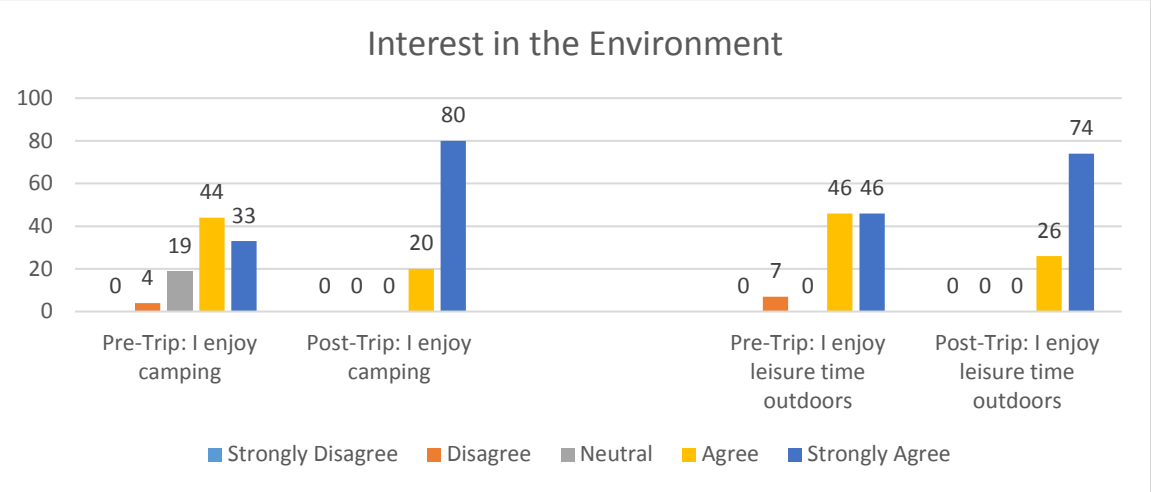

Figure 4: Comparing interest in the environment pre- and post- field-experience

It is also worth noting the students' change in opinion when it came to examining their own impact on the environment. Students showed a greater awareness of human impact on the environment after living in the wilderness for six days. They were dependent on the surrounding lakes to supply their water for drinking and cooking. They

were also dependent on the islands to provide them with a place to sit, eat, and sleep. This experience may have provided the students with a new perspective when looking at the landscapes of Minnesota. When students originally reflected on the statement "I am aware of how my daily activities have an impact on the environment around me" only 26% of the students strongly agreed. After their field experience, however, the percent of students who strongly agreed with that statement rose to 45% (See Figure 5).

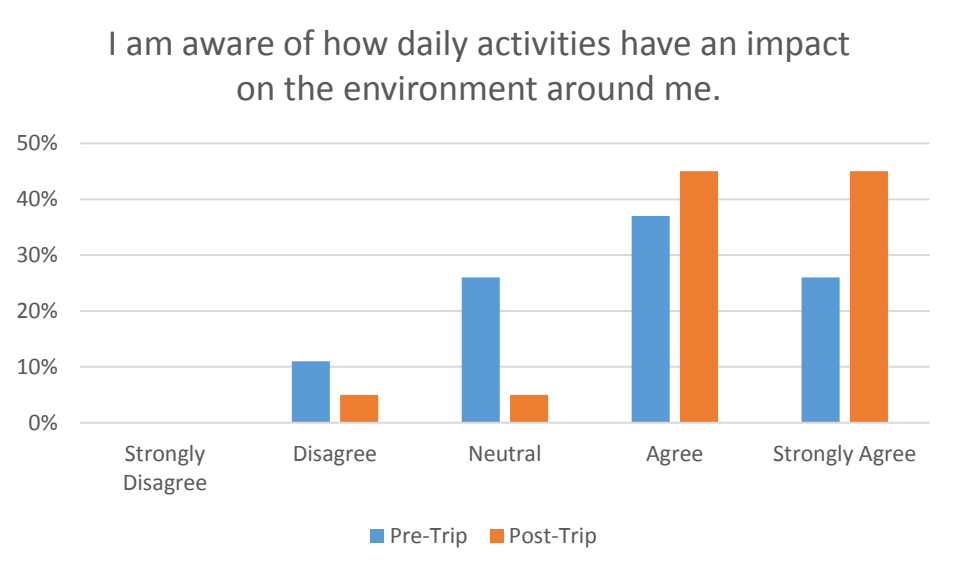

Figure 5: Comparing environmental awareness pre- and post- field-experience

My second hypothesis focused on self-reported personal growth. I predicted that students would walk away from FBS feeling more confident in themselves and their ability to overcome challenges based on my own field experiences. Each field course that I have taken or that I have taught encouraged me to step outside of my comfort zone, helped me to realize that I am stronger than I gave myself credit for, and that I could achieve more than I thought I was able to. The results of the Pre-Trip Survey and Post-Trip Survey have shown that students felt the same way that I have. There was an

increase in the percent of students who responded that they strongly agreed with the statement "I am confident in my ability to face challenges that arise in my daily life" from 36% to 55% (See Figure 6). More students also reported a higher confidence level when responding to the statement "I would feel confident in taking on a leadership role when an opportunity arises" illustrated by a decreased change from 36% to 31% of those agreeing with the statement and an increase from 50% up to 63% who strongly agreed (Figure 6).

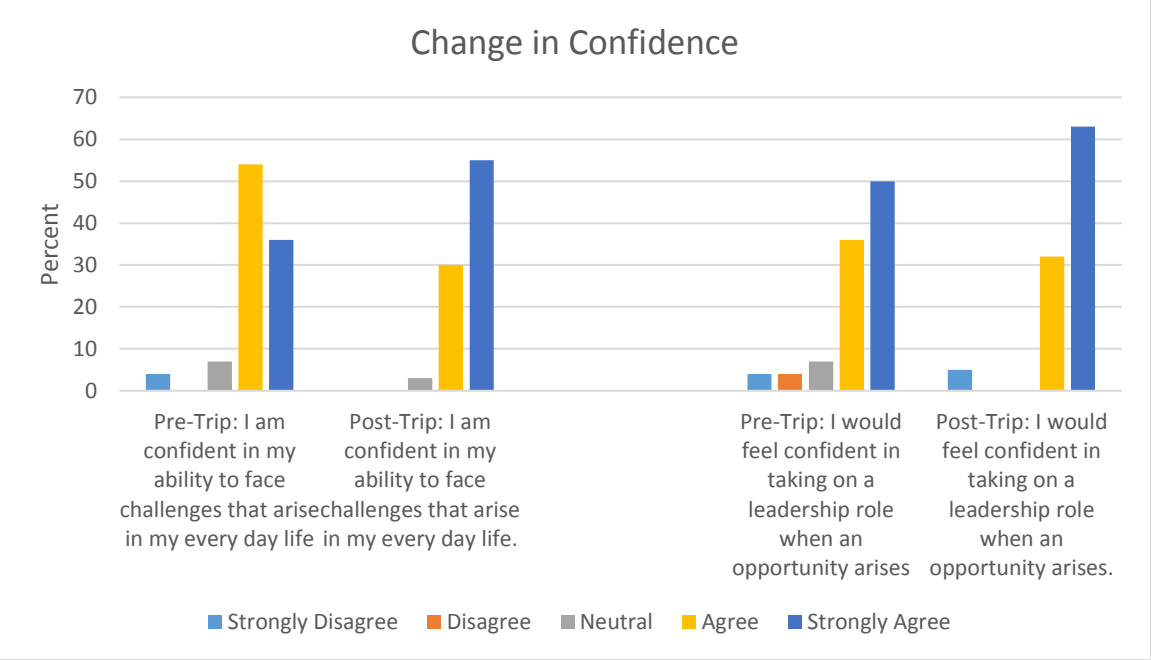

Figure 6: Comparing confidence levels pre- and post- field-experience.

My third hypothesis focused on students' communication. One intentional theme embedded in the eleven statements was aimed at measuring students' thoughts on his or her own ability to communicate effectively. The statements that students responded to include: "I am an effective verbal communicator," "I have a hard time discussing issues with someone who has a different opinion than my own," "I am an active participant in

small group settings," and "I avoid conflict when it occurs in my peer group." There was a general trend in the results that showed how students felt more effective at communicating after the FBS experience. The students who originally marked that they agreed with the statement "I am an effective verbal communicator" may have changed their opinion to "strongly agree." This is noted by the change in percent of those who agreed from 61% down to 55%, but those who strongly agree rose from 18% up to 30% (See Figure 7). Another change in the reported confidence in their communication skills is seen in the data set showing a drop from 42% of students agreeing that they have a hard time discussing issues with someone who has an opinion different than their own, down to 10% (Figure 7). After participating in FBS, there was an increase in the number of students who said they were an active participant within small group settings. On the Pre-Trip Survey, 32% of students reported that they strongly agree with the statement "I am an active participant in small group settings." That number rose to 65% on the Post-Trip Survey (Figure 7). Finally, there was a slight decrease from 56% to 47% of students reporting that they agree with the statement "I avoid conflict when it occurs in my peer group" (Figure 7). These changes support my hypothesis that students would be more effective communicators after participating in a field experience course.

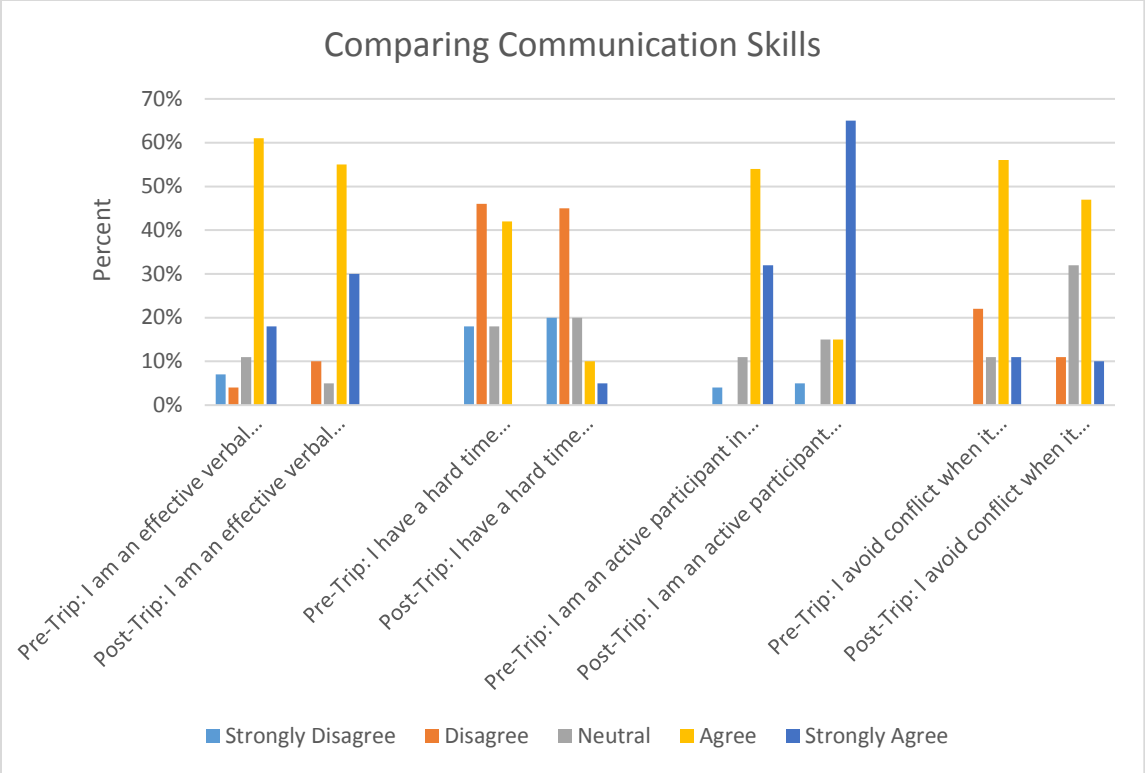

Figure 7: Comparing communication skills pre- and post- field-experience

Perhaps the most convincing evidence that illustrated the impact of a field-experience course was the students' open responses to the prompt "Describe the impact that the Summer Field Based Science course has had on you." When examining the responses, the comments were overwhelmingly positive and showed support for all three of my hypotheses. Each response could be categorized into at least one of five themes noted—some of the comments were classified into two or more themes. The five themes identified in the data include: appreciation for nature, personal growth, relationship building, human impact on the environment, and survival skills.

When looking through the student responses to the Post-Trip Survey, 75% of the students made a comment about having a greater appreciation for nature or an increased desire to spend more time outdoors since their FBS experience. Examples of the student

comments include, “I have a new found passion for nature and a desire to experience the world and Minnesota’s great outdoors,” “I learned so much about nature and how to respect and appreciate it better,” and “It has made me more interested in learning about plants, animals, and trees around me.”

Of the 20 students who completed the Post-Trip Survey, 75% of the students mentioned achieving some form of personal growth—specifically reporting a sense of pride for overcoming challenges, setting higher goals for themselves, becoming more adventurous, or experiencing a higher level of confidence when stepping outside of their comfort zone.

The majority of students, 60%, also made a comment referencing their new friendships and personal connections to the others while on this trip. I group these comments with other comments about their ability to communicate because building relationships depends on one’s ability to communicate effectively. One student wrote “I have made many awesome new friends. [FBS] gave me a new outlook on what matters in life.” Another student wrote “It has made me to better communicate with people I don’t know very well.”

There were 4 of the 20 comments, or 20% of the students, who mentioned something about human impact on the environment. Four of the students reflected on their experience and realized that their personal actions can impact the environment. One student wrote, “I am much more aware of how small things can have a big impact on the environment, like the products I leave on the ground or where I do my business.”

Though I observed a fifth theme throughout the data—survival skills—this theme could be a sub-set to the human impact theme and statements. A few of the students who

commented about learning to live with less “stuff” and to rely on the basics also noted how so much of what we use on a daily basis is unnecessary to survive. They mentioned having a greater awareness of their luxurious lifestyle at home where they have access to so many comforts and “extras” which are totally unnecessary for survival.

Conclusion

The data supports each of the three hypotheses which state if students participate in an experiential-based learning opportunity then they would develop a greater appreciation for nature, demonstrate personal growth, and be more effective in communicating with others. Additionally, students were positively impacted by this field experience course as noted by their personal impact statements. In the next chapter, I will discuss my personal research experience, implications of my study, recommendations for future studies, and final conclusions.

CHAPTER FIVE

Conclusion

Overview

I conducted this study to answer the question "What are the impacts of an experiential-based learning opportunity?" As a student in the Natural Sciences and Environmental Education Master's program at Hamline University, I have learned first-hand about the benefits of environmental education, experiential education, human impacts on the environment, etc. Additionally, I have my own experiences that have helped shape my educational philosophy and views on the environment. Each new experiential-based opportunity that arises provides an opportunity for personal growth and gives me a chance to re-focus on what truly matters in this world. Throughout the research process I have learned more about how a field-experience can improve one's connection to the environment by sparking curiosity and helping to develop a greater sense of self. As a former co-teacher of the FBS course, I was interested in seeing the impacts of the field-experience course from a students' perspective. Though this research process was challenging at times, I am pleased with the overall experience I had with this study. In this chapter, I will summarize the overall conclusions drawn from this research study, address my personal experience throughout this investigation, the implications of this study, and recommendations for future studies.

Overall Conclusion

The data obtained from this research study suggests that a field experience course promotes a deeper appreciation for the environment, personal growth, and an ability to communicate effectively. The results of the Post-Trip Survey showed that 75% of students walked away from the field experience course with a greater appreciation for nature. The open-ended question "Describe the impact that the Summer Field Based Science course had on you" received comments such as "I have a new found passion for nature" and "I learned so much about nature and how to respect and appreciate it better." Students spent nine days in the wilderness, without technology and other modern distractions, and were fully immersed in nature. This unique opportunity gave them a chance to experience all that the surrounding environment had to offer. Another student made a comment about being more aware of his or her impact on the environment. The students' survival for the duration of the course was dependent on having clean, safe freshwater and a place to set up camp so they could cook food, eat, and sleep. The students who commented on having an awareness of the environment that they didn't necessarily have before seemed to understand that human activity can truly influence the environment. As mentioned earlier in this paper, Odom Fanning (2002) wrote about the importance of educating the public about human impact on the environment so that they can actively participate in solving the environmental issues we face on this planet. Additionally, Lisa Trattner suggests that active, discovery-based learning will increase one's ownership of his or her learning and may lead to them become better stewards of the land (2015). It seems that the FBS course has given students the hands-on experience that they need to feel connected to nature and to want to engage with it more.

The experiences that the students had while on their trip will hopefully lead them to sharing their passion for the environment with others and taking action on the issues they find important.

The participants of this study also reported some type of personal growth in their Post-Trip Survey responses. Many students (75%) expressed growth in terms of overcoming challenges while they were "on trail," setting higher personal goals for themselves, and/or feeling more comfortable in stepping outside of their comfort zone. Additionally, there was a positive trend when examining their responses to statements about their self-confidence. For example, 36% of the students strongly agreed with the statement "I am confident in my ability to face challenges that arise in my daily life" on the Pre-Trip Survey, but that number rose to 55% on the Post-Trip Survey. Similarly, there was an increase from 50% to 63% of the responses stating they strongly agree with the statement "I feel confident taking on a leadership role when an opportunity arises." The FBS course poses many challenges including living without the basic comforts of home such as a bed, running water and toilets, and fresh, clean clothes to put on each day. For just over a week, students are essentially living with ten new acquaintances, some may even be strangers to the students, meaning they may not feel as comfortable as they would if a loved one was traveling with them. Each group is also physically challenged as they literally carry all of the necessities and personal belongings, including clothes, sleeping bags, tents, food, cooking gear, and canoes, everywhere they travel and camp during the six day "on trail" portion of the course. Though this experience challenges students and pushes them outside of their comfort zone, it also

gives the participants a boost in their confidence levels because they are able to see what they are capable of in a unique and supportive setting.

In 2005, Richard Louv wrote a book titled *Last Child in the Woods* which examined how direct exposure to nature is essential for development of children's physical and emotional health. While playing outside, young people can learn to be independent and confident (Louv 2005). The data obtained in my study further supports what Louv reported—that experiential-based learning provides an opportunity for personal growth. The FBS students were challenged but encouraged to do their best. The students reported setting higher goals for themselves and being excited to go on more adventures with their families and friends.

The data also supports my third and final hypothesis that students would develop an ability to communicate effectively. Students who strongly agreed with the statement "I am an effective verbal communicator" rose from 18% on the Pre-Trip Survey to 30% on the Post-Trip Survey. Another factor supporting this hypothesis is the increase from 32% to 65% of students who strongly agreed with the statement "I am an active participant in small group settings." These students may have been more shy and reluctant to communicate with group members prior to their trip, but after spending nine days with a small group of new people, they felt more confident in themselves and better able to communicate with others. Additionally, this statement: "I have a hard time discussing issues with someone who has a different opinion than my own" focused on communication skills. Forty-two percent of students agreed with the statement on the Pre-Trip Survey, but it dropped down to 10% of students agreeing with the statement on the Post-Trip Survey. This tells me that after their field-experience, students were *more* comfortable discussing challenging issues/topics with their peers, even when they disagreed with the other person. Perhaps this change in responses is due to the fact that

the students spent six consecutive days with the same small group of people with few opportunities to isolate themselves or to get a break. It is likely that they disagreed with at least one other person at some point in time; however, it is essential that everyone in the group have open communication and respect for one another in order for the group to be successful "on trail." The well-being of the group depended on each person positively contributing to the group and although people may have disagreed, they had to find common ground and move forward as a team.

Another factor that may have played a role in students' reported increase in effective communication is the fact they did not have access to any type of technology, including cell phones, for the full six days "on trail." One student wrote "One of the biggest impacts that I feel FBS had on me was that when I got back home, I no longer felt the need to check my phone, social media, go online, etc." Today, our youth spend an average of about seven and a half hours in front of some type of screen (Roberts, 2005). I believe there is value in removing the technology and screens and having people communicate with one another face-to-face. In having direct communication, as the students did "on trail," it forces people to listen to one another and to make connections. Sixty percent of the student comments regarding the impact of the course mentioned something about building new friendships. Effective communication is an important component of all types of relationships and this field-experience course seemed to have taught some students that lesson.

Overall, the FBS course had many positive reviews and the student responses supported each of the three hypothesis. Students demonstrated an increase in their

appreciation and awareness of the environment, reported some kind of personal growth, and felt that they developed more effective communication skills.

Research Experience

When I began this research Capstone I was extremely apprehensive about the intensity of the lengthy and detailed research process. This was the first time I had ever been expected to conduct such an in depth research study of my own choosing. In the beginning, I had a difficult time finding a clear path for the research. I had a broad sense of what I wanted to study (the impact that the FBS course had on our students), but it was not until after drafting chapters one through three and the initial proposal meeting with my review team that I truly gained the clarity of and direction for my research plan.

During the Capstone Practicum course, where I was guided through the drafting of chapters one through three, I was unfocused and felt scatter-brained. The Literature Review chapter was by far the most challenging piece to write due to the seemingly infinite number of resources available at our fingertips via the Internet, encyclopedias, library resources, scholarly articles, and books. It was difficult for me to focus on one topic/pathway for my research study. As I read through the various resources and noted what I thought was important at the time, I felt that I was putting in so much time and effort, but was not seeing any real progress in the paper. Finally, after meeting with my review team, I gained the clarity and focus I needed. My team helped me hone in on a single path that guided me through the rest of my journey. From that point forward, I had to re-write most of the literature review chapter and find more evidence supporting the benefits of experiential and environmental education. It was then that I felt like I was truly learning from this research experience. I learned more about the value of hands-on

learning, because I was doing it myself in that exact moment. I realized that in order to gain an appreciation for something, one must really delve into the experience. This was a great reminder of why I chose to study the impact of experiential-based learning opportunities—in order for students to appreciate nature and gain confidence in themselves, they have to have a hands-on experience to reflect upon.

Months later, after collecting the student responses, I felt that the analysis and conclusion pieces of the study were able to flow much more freely. I had the vision and question narrowed down and was able to make connections between the student responses and the hypotheses that I had developed. I am very pleased with my efforts, the results, and product of this research study. Additionally, I am proud of myself for overcoming the challenges and obstacles along the way. Again, I feel a connection to this study due to the parallel theme of it being a hands-on experience for me.

To follow up with the research experience, I plan to share the results of my study with the participants and their families by sending them a summary of the results via email. I also plan to share this information with our school administration and my colleagues to demonstrate why we need to keep supporting this type of learning opportunity for our students.

Implications and Recommendations

Though I am pleased with the overall Capstone research study, there are areas that could be improved upon if I were to do this process again. First, the conclusions of this study are based upon a very small sample size. There were only 41 possible participants for the study at the time and of those 41 possible participants, there was only a 70% response rate (due to a lack of parent-consent forms) on the Pre-Trip Survey.

Furthermore, there was only a 48% overall response rate on the Post-Trip Survey. When reporting changes in student opinions, it must also be mentioned that one student's response could illustrate a 5% change in the data. Although some of the changes in the data seem to show a significant change in opinion, it may have only been one or two students who had a shift in thought.

Another implication for this study was that I designed and wrote the surveys based on what impacts I expected to see from the student response. Though I actively tried hard *not* to include a bias in the wording of the questions/statements, I do feel that if I had left the survey questions completely open ended, I may not have seem the same types of responses. Perhaps I would have seen more thorough explanations of how the FBS course impacted students (positively or negatively) on more areas than just environmental awareness, personal growth, and communication skills.

Additionally, if I were to conduct this research study again, I would attend one of the parent informational meetings that are held in the spring, prior to the trip, in order to introduce myself in person and explain the purpose of this research study. I would have the parents sign the consent forms there at the meeting in order to increase the number of students who would be eligible to participate. On the morning of their departure, as I was distributing the Pre-Trip Survey to eligible participants, the students who were not eligible to participate (due to lack of consent) said that they would have gladly participated in the survey, but that their parents likely just forgot to send the consent form back to me.

I would recommend personally distributing the Pre- *and* Post-Trip Surveys to the students while they are assembled in a large group. This seemed to have worked quite well for the Pre-Trip survey distribution. I do not believe that I would have had as great

of a return rate had I sent the survey out to eligible students via US Postal Service or via email. There was a decline in participation between the Pre-Trip and the Post-Trip Surveys, likely due to the fact that the Post-Trip Survey was emailed to students and I was not there to immediately follow up and collect their responses. The best way to get feedback from both the parents and the student participants would be to address them face-to-face.

The final recommendation I have for future studies, similar to this one, would be to do more of a longitudinal study. I would like to see the long-term impacts that the FBS course has on students who took the course over a year ago. I wonder if these students would note the same passion and awareness of the environment, levels of self-confidence and personal growth, and effective communication skills years after taking the course and if they would attribute any of the above to that experience.

Final Conclusion

Many studies illustrate the importance of experiential-based learning opportunities as it relates to student wellness and cognitive development. The evidence supports these claims and yet many schools are not providing hands-on learning opportunities to their students due to the high expectations for achieving the state standards. I think it is important for all teachers, administrators, and parents to sit down and examine the research. Perhaps then we could see a change in our educational system—where there would be less pressure to achieve high scores and more opportunities for experiential-education. The benefits of this type of change to the system include young people who are looking for challenges, appreciate the environment, seek opportunities to reduce human impact, and who are better able to communicate with others.

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Appendix A

Letter of Introduction and Parent Consent Forms

Dear Parent or Guardian,

I am a science teacher at [school name] and a graduate student working to obtain a Master's Degree in Natural Sciences and Environmental Education at Hamline University in St. Paul, Minnesota. As part of my graduate work, I plan to conduct research on the impact of a field experience course. I will gather this data by surveying students and analyzing their anonymous feedback provided in two brief surveys. The first survey, titled Pre-Trip Survey, will be handed directly to participating students (whose parents have consented by returning a signed copy of the enclosed Consent Form) who are enrolled in the 2016 Summer Field Based Science course as they board the Coach Bus transporting them to Lake of the Woods, Minnesota on July 17, 2016. The second survey, titled Post-Trip Survey, will be emailed to participating students after they begin the 2016-17 school year in September 2016. The results of these two surveys will be used to determine if the field experience course has any long-term impacts on students.

The purpose of this letter is to ask your permission for your child to take part in my research by completing both of the two surveys described above. This research will be public scholarship. The abstract and final product will be cataloged in Hamline's Bush Library Digital Commons as a searchable electronic repository. My results may also be included in an article for publication in a professional journal or in a report at a professional conference. Please note that in all cases, your child's identity and participation in this study will be strictly confidential.

There is little to no risk for your child to participate in this study. All survey responses will be confidential and anonymous. I will not record information about individual students, such as their names, nor report any identifying information or characteristics in my capstone paper. Participation is voluntary and you may decide at any time and without negative consequences that information about your child will not be included in the capstone. Upon completion of my capstone, I will mail out a summary of the results of my study.

I have received approval for this study from the School of Education at Hamline University as well as from the principal of [school name, Principal's name]. If you agree that your child may participate, please keep this page as well as the enclosed page titled

"Informed Consent to Participate in Qualitative Survey—Parent/Guardian Copy" for your own records. Then, please complete and sign the seconded enclosed agreement titled "Informed Consent to Participate in Qualitative Survey—Researcher Copy" and return it to me by mail using the self-addressed and stamped envelope. You may also scan a signed copy of the agreement and email it to me at [email address]. Please return the signed form no later than July 16, 2016. If you have any questions, please don't hesitate to call or email me.

Sincerely,

Allison Ronglien
[contact information]

Informed Consent to Participate in Qualitative Survey—Parent/Guardian Copy

Please keep this full page for your records.

I have received your letter about the study you plan to conduct in which you will be surveying students participating in the 2016 Summer Field Based Science course for your capstone research study. I understand there is little to no risk involved for my child, that his/her confidentiality will be protected, and that I may withdraw or my child may withdraw from the project at any time without negative consequence. I agree to allow my child, whose name is printed below, to participate in the study by completing both the Pre-Trip Survey and the Post-Trip Survey.

_____

Student Name (printed)

_____ _____

Parent/Guardian Signature Date

Parent/Guardian Copy

Informed Consent to Participate in Qualitative Survey—Researcher Copy

Please return this portion to Allison Ronglien no later than July 16, 2016 using the self-addressed and stamped envelope. Or you may scan a signed copy of this form and email it to me at [email address].

I have received your letter about the study you plan to conduct in which you will be surveying students participating in the 2016 Summer Field Based Science course for your capstone research study. I understand there is little to no risk involved for my child, that his/her confidentiality will be protected, and that I may withdraw or my child may withdraw from the project at any time without negative consequence. I agree to allow my child, whose name is printed below, to participate in the study by completing both the Pre-Trip Survey and the Post-Trip Survey.

_____

Student Name (printed)

_____ _____

Parent/Guardian Signature Date

Researcher Copy

Appendix B

Pre-Trip Survey

Remember all answers are anonymous, so please answer questions honestly.

1. Using the numbers 1 to 5, rank the following school subjects based on your level of interest in that specific subject area.

   1 = least interesting 5 = most interesting

   _____ English
   _____ History
   _____ Math
   _____ Science
   _____ World Language

2. On average, how many times would you say you have been camping each year?

   _____ 0-2 times/year
   _____ 3-4 times/year
   _____ 5-6 times/year
   _____ more than 6 times/year

3. Circle the statement that you feel best describes your immediate family. (Note: "outdoor activities" may include, but is not limited to, camping, canoeing, hiking, fishing, birdwatching, skiing, snowshoeing, etc.)
   1…. My family has never participated in any outdoor activities
   2…. My family rarely participates in outdoor activities
   3…. My family occasionally participates in outdoor activities
   4…. My family often participates in outdoor activities
   5…. My family participates in outdoor activities at least once a week

4. How interested are you in pursuing a career in science? (circle a number)
   1…. I am not interested in a science related career whatsoever
   2…. I am not very interested, but I am not sure what I want a career in
   3…. I am slightly interested in a science career, but I do not want to fully commit to at this point
   4…. I am definitely interested!
   5…. I am definitely interested and already know that I will pursue a career in science

If you answered anything other than a 1 above, please indicate which areas of science you are most interested in. Check all that apply

_____ Medical science
_____ Field Ecology Research
_____ Clinical Research
_____ Natural Sciences and Environmental Studies
_____ Chemistry
_____ Biology
_____ Physics
_____ Other (please specify):

5. Please use the scale below to share your opinion on the following statements:

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

	1	2	3	4	5
I am an effective verbal communicator.					
I learn best in an informal educational setting.					
I enjoy camping.					
I have a hard time discussing issues with someone who has a different opinion than my own.					
I am aware of how my daily activities can have an impact on the environment around me.					
I am confident in my ability to face challenges that arise in my everyday life.					
I am an active participant in small group settings.					
I learn best in a traditional classroom setting.					
I avoid conflict when it occurs in my peer group.					
I enjoy spending leisurely time outdoors.					
I would feel confident in taking on a leadership role when an opportunity arises.					

6. Have you ever participated in a field-experience camp or course before? If so, please describe the type of camp/course.

7. What was/were your reason(s) for enrolling in this Summer Field Based Science course?

Appendix C

Email to Students

Dear 2016 Summer FBS students,

I am writing to you because you participated in my Pre-Trip Survey prior to your Summer FBS camping experience this last summer. You may recall that I am currently working to obtain my Master's Degree in Natural Sciences and Environmental Education through Hamline University. The purpose of this email is to ask that you continue on with your participation in my research study for which I am examining what impact(s) a field-experience course has on students. Please use the web-link below to complete the Post-Trip Survey using Google Form. The survey will only take approximately 5 minutes. As with the Pre-Trip Survey that you completed on July 17, 2016, your participation is completely voluntary. Additionally, these answers will be submitted anonymously and all responses will be confidential.

Here is the link to the Post-Trip Survey: [web link]

Please note that the **deadline** for completing this survey is **Friday, September 16, 2016**.

Thank you for taking the time to complete these surveys. After analyzing all responses to the surveys, I will share a summary of my findings.

Please feel free to contact me with any questions or concerns.

Sincerely,

Allison Ronglien
[contact information]

Appendix D

Post-Trip Survey

1. Using the numbers 1 to 5, rank the following school subjects based on your level of interest in that specific subject area.

   1 = least interesting 5 = most interesting

   _____ English
   _____ History
   _____ Math
   _____ Science
   _____ World Language

2. How interested are you in pursuing a career in science? (circle the number that is closest to your opinion)

   1….I am not interested in a science related career whatsoever
   2….I am not very interested, but I am not sure what I want a career in
   3….I am slightly interested in a science career, but I do not want to fully commit to at this point
   4….I am definitely interested!
   5…. I am definitely interested and already know that I will pursue a career in science

3. If you answered anything other than a 1 above, please indicate which areas of science you are most interested in. Check all that apply

   _____ Medical science
   _____ Field Ecology Research
   _____ Clinical Research
   _____ Natural Sciences and Environmental Studies
   _____ Chemistry
   _____ Biology
   _____ Physics
   _____ Other (please specify):

4. Please use the scale below to share your opinion on the following statements:
1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

	1	2	3	4	5
I am an effective verbal communicator.					
I learn best in an informal educational setting.					
I enjoy camping.					
I have a hard time discussing issues with someone who has a different opinion than my own.					
I am aware of how my daily activities can have an impact on the environment around me.					
I am confident in my ability to face challenges that arise in my everyday life.					
I am an active participant in small group settings.					
I learn best in a traditional classroom setting.					
I avoid conflict when it occurs in my peer group.					
I enjoy spending leisurely time outdoors.					
I would feel confident in taking on a leadership role when an opportunity arises.					

5. What science class(es) are you enrolled in for the 2016-17 school year? Check all that apply.

_____ General Chemistry
_____ Enriched Chemistry
_____ General Biology
_____ Enriched Biology
_____ AP Biology
_____ AP Environmental Studies
_____ AP Chemistry
_____ AP Physics
_____ Environmental Studies
_____ Comparative Anatomy
_____ Human Anatomy
_____ Physical Universe
_____ Organic Chemistry
_____ OTHER (please list):

6. Since August 2016, have you made any changes to your schedule that involved adding or dropping a science class? If so, please identify what changed.

7. Describe the impact that the Summer Field Based Science course has had on you. Feel free to include personal growth, environmental awareness, interest in certain issues/topics, etc.

8. Would you recommend the Summer Field Based Science course to fellow classmates? Please explain why or why not.